# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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## DEVELOPMENT OF DATABASE AND WEBSITE FOR SMART QUEUE MANAGEMENT SYSTEM

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer Systems) with Honours

By

**CHIN CIAN RHU**
**B071310530**
**930913-06-5206**

FACULTY OF ENGINEERING TECHNOLOGY
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# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **DEVELOPMENT OF DATABASE AND WEBSITE FOR SMART QUEUE MANAGEMENT SYSTEM**

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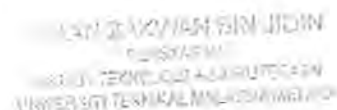| | | |
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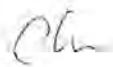28000 TEMERLOH PAHANG

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# APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the Bachelor of Computer Engineering Technology (Computer Systems) with Honours. The member of the supervisory is as follow:

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EN. AIMAN ZAKWAN BIN JIDIN

# ABSTRAK

Barisan merupakan sebentuk garis untuk orang yang sedang menunggu giliran mereka. Sistem pengurusan giliran dapat mengatur barisan dengan sistematik. Contoh sistem pengurusan giliran termasuk tiket kertas, tiket SMS dan sebagainya. Tiket kertas akan menyebabkan banyak penggunaan kertas yang tidak sesuai dengan teknologi hijau dan masa menunggu yang panjang. Sistem pengurusan giliran yang telah wujud tidak mempunyai fungsi sandaran. Oleh itu, maklumat akan hilang apabila gangguan berlaku. Pengguna tidak boleh menyemak maklumat status dengan menggunakan sistem tiket SMS. Pemantapan sistem ini mempunyai fungsi sandaran dan pengguna boleh menyemak status maklumat dan maklumat terkini melalui laman web yang diciptakan. Objektif adalah untuk membangunkan pangkalan data dan laman web untuk meningkatkan Sistem Pengurusan Giliran Smart yang sedia ada. Melalui sistem ini, pengguna boleh mendapatkan tiket SMS dengan memasukkan nombor telefon bimbit di antara grafik muka pengguna ataupun laman web. Tambahannya, pengguna akan menerima mesej apabila giliran mereka sudah dekat. Laman web ini dibangunkan dengan menggunakan HTML, CSS, dan bahasa PHP. SQL digunakan untuk membangunkan pangkalan data yang akan menghubungkan ke antara grafik muka pengguna. Simulasi dan ujian eksperimen telah dijalankan untuk memastikan fungsi dan kegunaan projek dengan baik.

# ABSTRACT

Queues is sequences of people waiting for their turn to proceed. Queue management system is developed to organize queue in a systematic way. Examples of queue management system including paper ticket, SMS ticket and so on. The conventional paper ticket system was too many papers utilization that incompatible with green technology and cause long waiting time. The existing smart queue management system had no backup function when outage happens. Therefore, all information will be lost when the outage happens and customers cannot check status information by SMS ticket system. Enhancement for this system is automatically backup and updated information and also allow users to check status information through developed website. The objective of this purpose system is to develop database and website for enhancing existing Smart Queue Management System. Through this system, users can obtain SMS ticket by entering handphone number at user interface at counter or website. In additional, customers will receive a notification message when their turn is near. The website is developed by using HTML, CSS, and PHP language. SQL is used to develop the database that will link to the user interface. Simulation and experimental tests were conducted to ensure the functionality and reliability of proposed project.

# DEDICATION

To my beloved parents, supervisor, panels and all friends.

# ACKNOWLEDGEDMENT

I would like to thank to my supervisor Sir Aiman Zakwan Bin Jidin who gave me a good opportunity to do this project, which also helped me in doing a lot of Research. This make me know about so many new things therefore I am really thankful to him. Secondly, I would like to offer my special thanks to panels, Sir Shamsul Fakhar Bin Abd Gani and Sir Hasrul Nisham Bin Rosly. Their advice and suggestion has been a great help in my report. I would like to thank my parents whose encourage and never left my side. I also dedicate to my friends who have supported me throughout the process. I will always appreciate all they have done, especially my best friend for helping me to develop my technology knowledges and skills. Both of you have been my best cheerleaders to complete this project successful.

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| | | |
|---|---|---|
| ANSI | - | American National Standards Institute |
| APIs | - | Application Programming Interfaces |
| ASP | - | Active Server Pages |
| AT | - | Abbreviation of Attention |
| BCF | - | Base Station Control Function |
| Bool | - | Boolean |
| BSC | - | Base Station Controller |
| BSS | - | Base Station Subsystem |
| BTS | - | Base Transceiver Station |
| CDMA | - | Code division multiple access |
| Char | - | Character |
| CSS | - | Cascading Style Sheets |
| DBMS | - | Database Management System |
| DCL | - | Data Control Language |
| DDL | - | Data Definition Language |
| DML | - | Data Manipulation Language |
| DOM | - | Document Object Model |
| FIFO | - | First-in-first-out |
| GGSN | - | Gateway GPRS Support Node |
| GPRS | - | General Packet Radio Service |
| GSM | - | Global System for Mobile Communication |
| GTP | - | GPRS Tunneling Protocol |
| GUI | - | Graphical User Interface |
| h1 | - | Heading 1 |
| HTML | - | Hyper Text Markup Language |
| Hz | - | Hertz |
| IDE | - | Integrated Development Environment |

| | | |
|---|---|---|
| Int | - | Integer |
| IP | - | Internet Protocol |
| ISDN | - | Integrated Services Digital Network |
| LCD | - | Liquid Crystal Display |
| MSC | - | Mobile Switching Center |
| NSS | - | Network and Switching Subsystem |
| OSS | - | Operations Support System |
| PC | - | Personal Computer |
| PCB | - | Printed Circuit Board |
| PDP | - | Packet Data Protocol |
| Perl | - | Practical Extraction and Reporting Language |
| PHP | - | Hypertext Preprocessor |
| PWM | - | Pulse Width Modulation |
| QMS | - | Queue Management System |
| RDBMS | - | Rational database management system |
| SD | - | Secure Digital |
| SGSN | - | Serving GPRS Support Node |
| SIM | - | Subscriber Identity Module |
| SMS | - | Short Message Service |
| SQL | - | Structured Query Language |
| SRAM | - | Static random-access memory |
| SRXD | - | Serial in |
| STXD | - | Serial out |
| TDMA | - | Time division multiple access |
| TTL | - | Transistor-transistor logic |
| UARTs | - | Universal Asynchronous Receiver/ Transmitter |
| USB | - | Universal Serial Bus |
| WAP | - | Wireless Application Protocol |
| WCDMA | - | Wideband Code Division Multiple Access |
| XHTML | - | Extensible Hypertext Markup Language |
| XML | - | Extensible Markup Language |

# CHAPTER 1
## INTRODUCTION

## 1.0    Introduction

Queues are a part of everyday life and it deals with one of the most unpleasant experiences of life. Queueing is very common in many fields such as telephone exchange, supermarket, petrol station, computer systems, etc. Customers are suffering from queue system and they need a fast, accurate and comfortable service. By reducing the waiting time usually requires a good queue management system.  Smart queue management system offers a process of good and easy service to customers. This system will reduce the burden of waiting in a long queue until one gets attended.

The function of existing queue system allows customer get their sequence number without using paper ticket but using the smartphone. The advantage of an existing system is customer will receive a notification message when their turn is near to make them alert. While limitation for existing system was there has no backup function when the outage happened. Therefore, a database is needed to store the information. Besides that, users cannot surf the queue number through the website by using the existing system.

The improvement targets for this project is to develop database and website for smart queue management system. Conventional queue system does not have a database to do storage and backup for the status information. If the system fails, smart queue management system is able to backup as it ensured minimal disruption to the operation. This project can reduce the utilization of paper because this system allows the website feature to be incorporated into the system in which the customer's mobile phone is linked to the queue number he or she has taken. In contrast to that, the customer can surf their own queue number, sequence number and estimated time through the website at

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anywhere and anytime. The additional function for this project allowed users to get a paper ticket if he or she has no phone number.

The thesis outline in chapter 2 was the literature review. A literature review was from research. For example, components, software, and hardware used. The purpose of this project was to replace the ordinary queue system by using the cell phone or website to get status information. The methodology will also continue in chapter 3 by using the flow chart, design, table and so on. Chapter 4 discussed about the development of software and hardware, result, analysis and limitation of project. Thesis outline in chapter 5 was conclusion and recommendation for proposed system.

## 1.1    Background

In the present of growing economy, long queue in public area is a big problem for customers. In experiences life, queuing is the most common reasons for customer disgust. Despite technological advances such as online and mobile banking, customers still complain about their queue. This queue management system is specially designed for public allowing them to reduce queue lengths, waiting time and increase n efficiency of work. An intelligent system to increase performance and operational efficiency. Queue management system has become more and more popular nowadays in which many fields have started to implement this system.

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Figure 1.1: Long queue of Legoland Malaysia

Nowadays, many queue management systems are developed to allow users making a reservation for the queue. Using the Internet to make a reservation can eliminate most of this kind of secondary queuing. This can reduce the time-consuming for users. The most important point would seem to be that of improving the experience factor of the user, by changing the ordinary queue management system to smart queue management system. Which is user will get the paper ticket at first, but after using smart queue management system they will get the queue number through a cell phone or website.

After customers walk into office or shop, that customer may select the service they want on a touch screen kiosk and also take a ticket. The LCD screen will progress ticket number, alongside any adverts or others messages the user may want to show. Staff can see kind of services customers are required and waiting for, then call the ones they are best qualified to serve. When the advisor calls the customer, their queue number will show on the screen above the service counter. A voice function helps is to conduct customers to their position of the counter. This system can automatically track the customer volumes, transaction times and waiting times.

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## 1.2 Problem statement

Queuing is one of the biggest dissatisfiers for the public which approach to queuing is being expected by a large number of customers and citizens. Conventional paper ticket printed was utilization of paper as a ticket so it is incompatible with green technology. Besides that, users cannot estimate the estimated waiting time which caused long queueing. There has no backup function for the existing queue management system, the information will be lost if the system is outage and user cannot surf their sequence through the website.

For this project, a database is needed to update store and backup information. MySQL was used to create and manage the database. Smart Queue Management System is cost saving because the user can check their status information through the website. A notification message will send to the customer when their turn is near to make them get alert with their turn and reduce the length of the queue. PHP and HTML were used to develop and build the web page.

## 1.3 Objectives

The objectives of this project are stated below:

1. To study how to design and create a website and database which will link to the queue management system user interface.
2. To develop database and website for enhancing existing Smart Queue Management System.
3. To analyze the performance and functionality of project regarding for smart queue management system.

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## 1.4    Work scope

The purpose of this project was developed database and website for smart queue management system. Work scope was divided into two section which is hardware and software. Firstly, done researched and planned about hardware and software. Hardware was used in this project is Arduino, GSM, wireless router and Ethernet module. Arduino Mega work as received input (client mobile phone number) by using Ethernet module from the database and transmitted output (information and notification message) to the user by using GSM. Next, software used to develop this system were Arduino IDE, XAMPP, and notepad++. Database and website were created to store and update information by using HTML, PHP, MYSQL, and CSS. MySQL used to create and manage the database for backup function and PHP is to link and update the user sequence with database and user interface on that day.

This project was focused on developing database and website and also tested by using graphical user interface. The test should be done in the following situation. If the customer wants to achieve queue number, they need to key in their phone number at the user interface. Then the database will automatically store and generated a sequence number. The system will send a message to user's phone. If their turn is near, the user will receive a notification message to make them alert with their turn.

In addition, the user can get their own queue number, estimated waiting time and sequence number by browsing the website. This website will also keep update with user interface and database. The database will update when the user is performed to get the ticket's number on user interface and send out from GSM and the website will also update when the sequence is changed. To make an analysis on the overall performance of this system, a comparison with the existing system and current system will be done.

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## 1.5    Conclusion

The most frequent complaint of customers is the waiting time. In addition, waiting is very unrewarding. Customers cannot wait for the long hour in queue place without doing nothing. This will waste customer precious time. Some amount of waiting is and should remain part of the attraction, but it should be made more manageable. All customers should be able to know the waiting time should be spent. A notification message will be sent to alert customers when their turn is near. It also allows remote queue number and achieves estimated waiting time through facilities like the Internet. A database is developed to do backup and storage for status info. Therefore, this will allow a more satisfying day for the customers.

# CHAPTER 2
## LITERATURE REVIEW

Chapter 2 is the explanation of theory regarding this project, which revealed the knowledge via resources such as journals, articles, reference books, newspaper, websites and so on. This research played an important role to complete this project. Besides that, references are necessary to gain more knowledge for smart queue management system, Arduino, GSM technology, Ethernet module, programming language, the comparison between traditional and current queue management system, an existing project, related research, etc.

There have some issues which are been considered to be solved in this project. The presented of solutions for these issues are to enhance the services speed for users, improve an efficiency of work and also reduce customer waiting time. With it comes to manage and control queue, a smart queue management system is something that will be very useful. For example, this system will apparent to those banks, cinemas and so on.

## 2.0 Introduction

Many types of research were done based on hardware, software and programming language for this project. Every hardware, software and programming language that related to this project will explain in more details. Every theory and information will be compared and the suitable will be selected that will use in this project. The current research shows that system architecture and website design and structure are important components.

According to Arun, R and Priyesh, P.P (2013), smart queue management system will reduce the burden of waiting in a long queue until one gets attended. It is also implemented by many companies. The main objective was to design a system to maintain a queue with order and efficiency, through GSM Technology.

It becomes a platform for the customer to get information and queue number directly over the Internet using the web browsers such as Google chrome, Mozilla Firefox, Internet Explorer and etc. Through the Internet, queue management system offers a new approach in good services and provide an alternative option to let customers get their status info easily. Therefore, it's easy and convenient to them and even encourages them to use the Internet to surf their queue number without using paper. It is a more efficient way if compared to the way of using paper which is more expensive.

The easiest way to attract more customers to use the system is to maintain an easy and simple access to easily get the queue number and also create a positive web experience to the customer. Website security is also important in obtaining customers trust as they need to secure that the information provided is secured and protected and is used in appropriate and correct ways. Important details should be kept in private and encrypted. High-level security should be provided on the authentication and login systems. Besides that, the limitations of the authentication method used must also be clearly understood. To overcome this problem, many queue management system nowadays prefers login which can ensure a fast and secure.